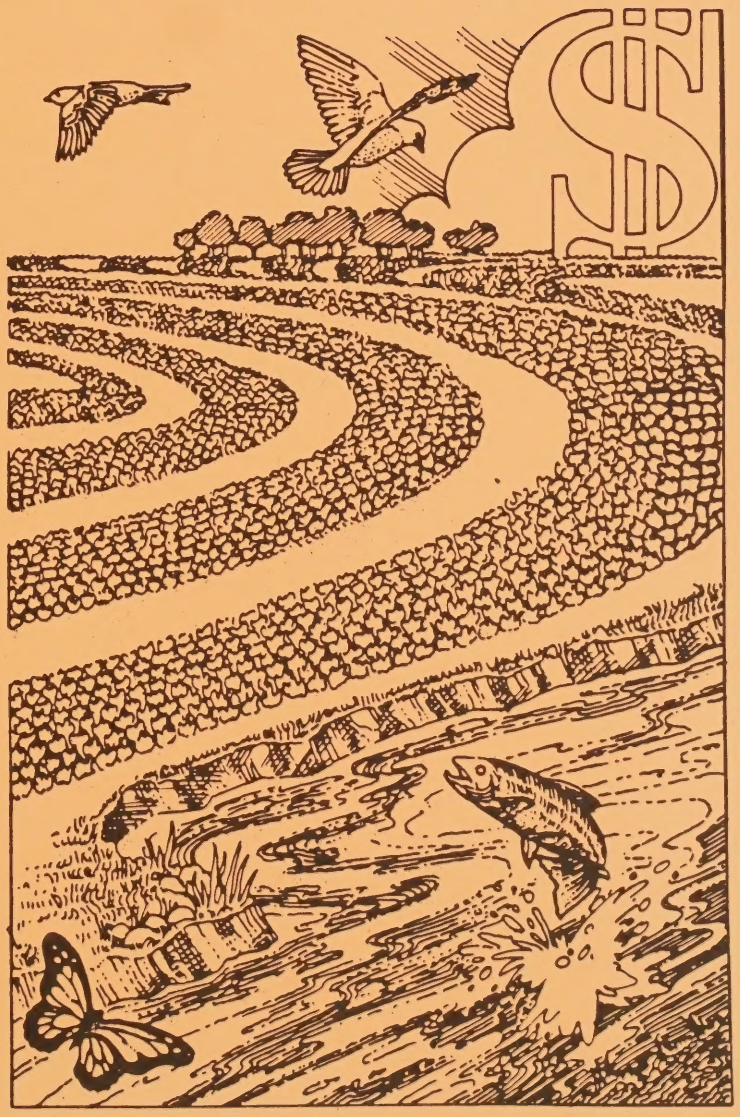
GEORGIA

Southern Region Projects Supported by Sustainable Agriculture Research and Education Program



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from project reports

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Overview of Georgia Projects

Congress has provided strong and growing support for the Sustainable Agriculture Research and Education grants program, also known as LISA (Low-Input Sustainable Agriculture). Administered by Cooperative State Research Service (CSRS), with the Cooperative Extension Service as a full partner, this program is forging partnerships between farmers, scientists, educators, agribusiness, non-profit organizations, and government -- a partnership that is beginning to promote better stewardship of the Nation's natural resource base. The program has supported 112 new projects since its inception in 1988; perhaps two dozen more will be funded by June.

Projects funded are typically carried out by teams of farmers, university research and education staff, government agencies, non-profit organizations, and private enterprise. Top priority is given to whole-farm integrated systems projects, usually including on-farm research and demonstrations. These projects are providing scientific documentation of low-input sustainable farming practices and systems, in comparison with conventional or chemical-intensive agriculture.

Farmer involvement is one of the strengths of this program -- 1,860 farmers nationwide have participated in projects during the first three years. When farmers participate in the planning and execution of a project, two important things happen. Concerns of farmers are foremost in the design of the project. And scientists get directly exposed to innovative ideas developed or tried by farmers. These ideas often become an integral part of scientific studies. The result is both better science and a more widespread adoption of more sustainable farming methods that are economically viable, socially acceptable, and environmentally sound, assuring cleaner water and a plentiful supply of safe food for generations to come.

The coordinators of Georgia projects were asked about participating farmers. Here is what they reported:

- A total of 16 Georgia farmers have participated in LISA research and education projects;
- 12 are reported to have helped generate ideas for these projects, and 9 help manage the projects;
- 2 farmers have provided land for replicated experiments; another 10 provided land for unreplicated studies, and 10 for demonstration plots;
- 12 are helping with the evaluation of projects.

Projects Funded 1988-1991

Eleven projects funded by this program that include Georgia scientists, farmers, or educators in major roles are described here. They received a total of $863,847, and provided $2,327,194 matching funds. In most of the projects, a scientist serves as the Project Coordinator. In others, a farmer or other local area residents are contributing to a multi-state project headquartered in another state.

Low-Input and Organic Pest Management for Apples and Peaches Using Mating Disruption and Ground cover Management (LS88-1)

Summary

Low-Input Southern Tree Fruit Disease and Insect Control

In view of consumer alarm over pesticide residues on fruits, a team of scientists (led by Dan Horton and Floyd Hendrix in Georgia and Douglas Pfeiffer in Virginia) have developed alternative methods of controlling fungus diseases and insect pests. Instead of relying on heavy preventive spraying to control the fungus diseases called sooty blotch and flyspeck, these scientists have developed post-harvest techniques for dipping the fruit in a household bleach solution. Sooty blotch is completely removed by this treatment, and flyspeck is reduced by 73 percent. When sprayed fruit is dipped in bleach solution, most of the residues of pesticides are also removed. Using this bleach dipping method, growers may eliminate up to eight sprayings.

These scientists have also found that most major post-bloom insect pests are effectively controlled by pheromone mating disruption plus a single well-timed spray. They tie to the branches of the trees hundreds of little "twisties" that emit a certain pheromone or a mating attractant, like a chemical given off by the female at mating time. It completely confuses the males. They fly all over the orchard trying to find the females. It disrupts the whole reproductive process, and greatly reduces the population of the pest.

In addition to mating disruption, alternate-row spraying and ground cover management help conserve natural enemies of the pests and reduce the number of sprays. The overall LISA pest control system developed in this study achieves equal or better control of insect and disease injury as compared with the standard practice used in these states. Meanwhile the number of sprays is reduced from 19 per season to an average of 9.5, thereby reducing the pest control costs from $247 per acre to $99 per acre. When you have no reduction in yield but you have a major reduction in costs, it doesn't take any sophisticated economic analysis to figure out that profit is increasing. That kind of success story really gets farmers attention very rapidly. They don't have to be persuaded. Unfortunately we don't have many win-win success stories like this one yet, but we have only just begun. Post-harvest chlorine bleach treatment of fruit allows growers to ignore two important fungus diseases, sooty blotch and flyspeck. The concentration of sodium hypochlorite (the active ingredient in household bleach) found to be 94% effective in removing sooty blotch from fruit (post-harvest) is 500 parts per million if the fruit is just dipped, 200 ppm if the fruit is dipped and brushed.

While 94% reduction is considered successful, a dip with 940 ppm achieved a 100% reduction. The chlorine volatilizes rapidly, leaving no residue. This ingredient is exempted from food tolerances by EPA due to its low risk. In addition, a 500 ppm dip completely removed the residue of fungicides Captan and Maneb, and removed all but 0.2 ppm of Phosmet.

Project Coordinator:	F. F. Hendrix, **University of Georgia**
Major Participants:	**University of Georgia**: D. Horton, N. McGlohon; **Virginia Polytechnic**: D. Pfeiffer, R. Marini, J. Derr; **Mary Washington College**: J. Killiam
Project Duration:	2 Years (June 1, 1988 to May 31, 1990)
Total Funding:	LISA Funds: $100,000; Matching Funds: $223,882

Planning Grant Development of Low-Input Agricultural Technology Demonstrations at the Sunbelt Agricultural Exposition Demonstration Farm (LS88-3)

Summary

A comprehensive approach to the selection, screening and development of demonstrations of low input agricultural systems. The annual agricultural exposition operates a 540 acre farm, on which over 160 demonstrations are conducted each year. This planning project will assemble a Council of Advisors comprised of researchers, educators and farmers from eight southeastern states (VA, NC, SC, GA, TN, FL, AL, MS) to identify and screen low-input agricultural technology and systems. Furthermore, this Council of Advisors will provide direction for successful "on farm" demonstrations of that technology or those agricultural systems most effective in reducing use of off-farm input resources.

Project Coordinator: John Beasley, **University of Georgia**

Major Participants: C. Douglas, **University of Georgia**

Project Duration: 1 Year Planning Grant starting June 1, 1988

Total Funding: LISA Funds: $14,700; Matching Funds: $33,900

Low-Input Reduced Tillage Crop Production Systems for the Southern United States (LS88-7)

Summary

Reduced tillage potentially can play a key role in sustainable agriculture production systems by reducing soil erosion, decreasing fossil fuel use, decreasing weed pressure through maintenance of surface mulch, and enhancing soil productivity through crop residue and organic matter maintenance. Reduced tillage technologies have not been incorporated into low-input cropping systems. The overall thrust of this project is to develop low-input wheat/soybean/corn production systems which incorporate reduced tillage technologies.

Project Coordinator: W. L. Hargrove, **University of Georgia**

Major Participants: **University of Georgia:** J. R. Allison; **Clemson University:** J. H. Palmer

Project Duration: 3 Years (June 1, 1988 to May 31, 1991)

Total Funding: LISA Funds: $218,977; Matching Funds: $628,176

Solarization and Living Mulch to Optimize Low-Input Production Systems for Small Fruits (LS88-10)

Summary

Living Mulch for Blueberries

Disease, insect and weed pressures can be major limiting factors to successful fruit production in the South. Production of most horticultural crops in the South is chemical- and labor-intensive. Some fruit crops like blueberries and strawberries, however, may lend themselves to alternative farming systems. For blueberries, disease and insect pressures are minimal. The crop could be grown free of chemical inputs if suitable management alternatives to soil fertility and weed controls were available. One alternative is the use of living mulches. By proper selection of living mulch cover crops, weed competition could be eliminated through both a smothering of the weeds and an allelopathic effect. Nutrient inputs could also be supplied by the decomposing mulch.

When the efficacy of living mulch systems for blueberries was evaluated by Kim Patten and his colleagues in growers' fields in Texas and Georgia, rye and annual ryegrass resulted in the highest mulch production and most consistent stands of mulch crops in the winter. In producing blueberries, it is absolutely essential to have a ground cover or a mulch, to protect the plants in the winter. This is a very expensive operation when farmers buy and distribute straw or some other kind of mulch in their blueberry fields. Farmers in this project are growing their own mulch right in the fields. Pearl millet was the most successful cover in the summer. Crimson clover was the only legume tested that was found to be suitable for a living mulch crop. Several crops, especially pearl millet, exhibited allelopathic weed control. The estimated cost of using cover crops twice a year for living mulch is $130 per acre for blueberries, approximately the same cost encountered with the conventional blueberry fertilizer and herbicide program. However, the living mulch provides many advantages farmers don't get from chemicals-- advantages that are being tested over several years to protect growers against false "successes" that may fail after a year or two.

Project Coordinator:	Kim Patten, **Texas Agricultural Experimental Station**
Major Participants:	**Overton:** R. Smith, V. Haby, M. Baker; **College Station:** J. Starr, C. Lyons; **Lubbock:** D. Bender; MS: B.Smith; **University of Georgia:** G. Krewer
Project Duration :	3 Years (June 1, 1988 to May 31, 1992)
Total Funding:	LISA Funds: $80,000; Matching Funds: $81,197

Effective Nitrogen for Low -Input Forage and Grain Production in a Thermicudic Region (LS90-20)

Summary

Effective and economical alternatives for meeting nitrogen (N) requirements in crop production are crucial for low input agricultural systems on thermicudic soils which comprise the 15.3 million hectares in the Southern Piedmont region. Organic N from animal manure and winter legumes are potential sources for the region; however, management, effectiveness, and economics of these sources are uncertain and merit study. The efficacy of N supplied by these organic sources for grain and forage production will be described and compared with a conventional inorganic N source and a combination of organic and inorganic sources. This will be done over a 3-year period in a small watershed and selected farm fields. The study will examine daily rainfall distribution and its impact on N efficacy of the sources, and will assess the cumulative treatment effects and economic performance. Experiments will focus on N supply to small grain and forage crops, both grazed and machine harvested. Effects of animals on water quality in low input systems will be assessed in a gauged watershed. N inputs will be accounted for and their availability and synchronization with crop needs will be described. The project is being conducted by a highly committed and diverse team of participants, including farmers, technology and information transfer persons, commercial producers, and research scientists.

Project Coordinator : R. Russell Bruce, **Southern Piedmont Conversation Research Center (USDA/ARS)**

Major Participants: USDA/ARS: L. A. Harper, G. W. Langdale, W. M. Snyder, J. A. Stuedemann, S. R. Wilkinson; **University of Georgia**: D. A. Crossley, N. R. French, P. F. Hendrix; **Oconee River Resource:** M. Hayes; **Georgia**: W. I. Segars

Farmers : Georgia: C. D. Dawson, G. A. Hillsman, W. Montgomery

Project Duration: 3 Years (March 1, 1990 to February 28, 1993)

Total Funding: LISA Funds: $195,000; Matching Funds: $538,200

An Educational Program in Low-Input Sustainable Agriculture Production Technology and Philosophy (LS90-21)

Summary

There is a wide variety of perceptions of the meaning of low-input, sustainable agriculture among agricultural industry leaders. Consequently, there is an obvious need for an educational program directed at agricultural leaders from all sectors in agriculture in Alabama, Florida, Georgia, and South Carolina. The clientele would include agricultural policy makers, leaders of farmer organizations and commodity groups, university administrators, researchers, and extension workers. This proposal suggests holding a two-day conference to introduce this clientele to current LISA technology and its uses in order to enhance the possible adoption of this technology and the support (both monetary and legislative) it receives from the agricultural industry.

The overall objective of this proposed educational program is to promote a better understanding of LISA technology and philosophy and to foster the formation of new research and extension interest in this area through a conference for agricultural industry leaders. The intended audience includes industry leaders in the private sector, agricultural researchers and extension specialists at universities, county extension faculty, and government officials responsible for public policy decision.

Project Coordinator: S. Ford, **University of Florida**

Major Participants: **Clemson University:** J. Brittain; **Auburn University:** J. Crews; **Georgia Experiment Station:** W. Hargrove

Project Duration: 1 Year (March 1, 1990 to February 28, 1991)

Total Funding: LISA Funds: $18,000; Matching Funds: $24,311

Development of an Environmentally Safe and Economically Sustainable Year-Round Minimum Tillage Forage Production System using Farm Animal Manure as the Only Fertilizer (LS90-24)

Summary

This project will identify, develop and demonstrate some techniques, methods, and systems which can be used to recycle manure to animals through production and consumption of forage crops without negatively impacting on the environment. Liquid manure resulting from flush cleaning of dairy cow facilities will be applied with irrigation water at four rates, each at intervals of 7 to 14 days, onto corn and rye seeded into a bermudagrass sod. The purpose is to have a year-round, actively growing plant cover. Sensitive monitoring and analytical instrumentation will be used to determine the fate of manure nutrients (N, P, K, Ca, Mg and Na) in soil and groundwater when different amounts are applied onto crops. Nutrient utilization efficiencies will be determined for each crop and the total system. Changes in soil nutrient content and soil invertebrate populations will be related to manure application rates and examined for any cumulative effects on sustainability of crop production. Data from all segments of the proposed research will be evaluated and results used to identify manure utilization procedures and crop production systems which have economical soundness, low input sustainability, and are environmentally safe.

Project Coordinators: Joseph C. Johnson, Jr., and G. Larry Newton, **University of Georgia**

Major Participants: **University of Georgia:** J. G. Davis-Carter, G. Vellidis, D. Carley, W. A. Thomas, R. D. Hudson; **USDA/ARS**: R. Hubbard, R. Lowrance, J. L. Butler, A. W. Thomas, A. W. Johnson; **University of Florida**: D. Bottcher

Georgia Farmers: J. Anthony, G. Russell

Project Duration: 3 Years (March 1, 1990 to February 28, 1993)

Total Funding: LISA Funds: $195,000; Matching Funds: $686,258

Development of Fractionation and Treatment Systems for Poultry Litter to Enhance Utilization and Reduce Environmental Impact (LS90-25)

Summary

The poultry industry is a major agricultural industry in the southeastern United States. It generates more than 25 percent of the agricultural income of Arkansas, Mississippi, Alabama, Georgia, North Carolina, Virginia, Maryland, and Delaware. To increase efficiency, this industry has a tendency to concentrate itself. Production concentration generates more poultry wastes than can be safely applied to cropland without environmental degradation. Valuable nutrients are also lost.

This study will determine more efficient methods of poultry waste utilization in cropping and livestock feeding systems. Preliminary work has shown that fractionation will recover litter material for subsequent reuse in poultry houses and will produce a fine material with improved handling qualities and increased nutrient concentrations. This study will evaluate the economic potential of litter fractionation for reuse of the coarse material in poultry production and use of the concentrated fines for crop production and ruminant feeding.

Project Coordinator: W. C. Merka, **University of Georgia**

Major Participants: **University of Georgia**: O. Pancarbo, S. Thompson, R. Atkinson

Project Duration: 2 Years (March 1, 1990 to February 28, 1992)

Total Funding: LISA Funds: $141,000; Matching Funds: $251,370

A Low-Input Manure Management System In Animal Housing for House Fly Control, Waste Reduction and Feed (LS90-27)

Summary

Manure in caged layer houses poses problems. Two of these are dense house fly populations and manure disposal. Currently, caged layer manure is periodically spread on pastures, or a relatively expensive system is needed to scrape the manure and pump it to a lagoon. The large numbers of flies produced are a nuisance which can bring litigation from neighbors and result in facility closures. Fly control with insecticides is expensive and short-lived. House flies rapidly develop resistance to any insecticide widely used. Current pest management systems call for drying the manure. This approach, first developed in California, is not practical in the humid southeast.

The proposed study is necessary prior to on-farm testing of a low input system that will reduce the bulk of manure by half, essentially eliminate house fly breeding dna and produce a high quality feedstuff. This system could save a 60,000 hen operation $6,000 for fly control and $5,000 or more in manure hauling each year. The native black soldier fly, a natural enemy of the house fly, has shown the potential to accomplish these benefits in experimental and practical situations. This study will test the engineering principles involved in this system to avoid major problems in a subsequent on-farm test. This system may have application in housing designed for other farm animals.

Project Coordinator: D. C. Sheppard, **University of Georgia**

Major Participants: **University of Georgia**: S. A. Thompson, G. L. Newton, N. Brogdon

Project Duration: 1 Year (March 1, 1990 to February 28, 1991)

Total Funding: LISA Funds: $18,000; Matching Funds: $37,442

Reference Manual Of LISA Resource Management Strategy Budgets For The Mid-South Region (LS91-33[51])

Summary

Conventional agriculture requires specialized, capital intensive systems that are dependent upon high levels of purchased inputs. Excessive use of many of these inputs can have detrimental effects upon the environment, and enhance consumer alarm regarding food safety issues, while reducing returns to farmers and increased their financial and health risk levels. Environmental and food safety improvements can be made, and farmers can gain financially from reduced cost levels associated with the incorporation of proven low-input farming methods.

The objective of this LISA proposal is to develop Resource Management Strategy (RMS) budgets for selected agricultural enterprises and systems located in the mid-south region. The budgets would provide sound economic information on LISA management practices to farmers, Extension personnel, ASCS and SCS offices and other interested individuals and organizations.

Project Coordinator:	Larry A. Johnson, **Agricultural Economics & Resource Development Agricultural Extension Service, University of Tennessee**; Clark D. Garland.
Major Participants:	**Auburn University, University of Georgia, Mississippi State University.**
Farmer Participants:	**Tennessee, Georgia, Alabama**, and **Mississippi**.
Participating Extension Agents:	**Tennessee, Georgia, Alab**ama, and Mississippi
Project Duration:	2 years
Total Funding:	LISA Funds: $50,000; Matching Funds: $50,000

Improved Nitrogen Use-Efficiency in Cover Crop-Based Production Systems (LS91-35[20])

Summary

Environmental concern regarding nitrate (N) pollution of groundwater is a major problem facing agriculture in the 1990's. Winter annual cover crops, as a component of conservation production systems, can provide a means of utilizing residual or mineralized nitrate in soils during non-crop periods and thereby reduce the amount of nitrate leaching into ground water. The subsequent availability of N recovered by cover crops can also improve resource-use efficiency in sustainable production systems. This potential role of cover crops has not yet been adequately documented in field experiments.

The proposed research will be a multi-state and multi-disciplinary activity, utilizing field experiments and tracer techniques to achieve the stated objectives. Results from this research will help identify cover crops capable of maintaining soil productivity and environmental quality via efficient utilization and subsequent recycling of residual soil N. Information transfer will be accomplished through presentation at state and national meetings, publication of scientific journal articles, extension literature, and field day activities.

Objectives

(1) Evaluate the potential of several cover crops to capture residual fertilizer N from a corn production system.

(2) Study the field and laboratory decomposition of cover crops for the purpose of developing a simulation model to describe N release from cover crops over a wide range of soil and climatic environments.

Project Coordinators: M. G. Wagger, **North Carolina Sate University**, Raleigh, NC; G. D. Hoyt, **North Carolina State University, Mountain Research Station**, Fletcher, NC.

Major Participants: W. L. Hargrove, **University of Georgia**, Griffin, GA; M. L. Cabrera, Athens, **GA**

Project Duration: 3 years

Total Funding: LISA Funds: $179,992.00; Matching Funds: $261,922.00